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Transfusion Medicine | LETTER TO THE EDITOR

An analysis of blood donor deferrals among repeat donors

Dear Sir,

Providing safe blood and blood supply is essential to the healthcare system. Blood donor selection is designed to ensure the safety of both the donors and recipients (Cheraghali, 2012). Currently, all blood donations in Iran are provided by voluntary and non-remunerated donors, and the Iranian Blood Transfusion Organization (IBTO) is the sole official organisation responsible for transfusion safety for the entire country (Mahmoodian-Shooshtari & Pourfathollah, 2006). The main purpose of IBTO is to supply blood with minimum risk to the donors and recipients. The IBTO has provided a data management software system for all blood centres, which includes the donation history and results of screening tests for each donor.

Based on the last estimation, about half of Iranian blood donors are repeat donors (Cheraghali, 2012). A repeat donor is examined and screened several times, so he or she will have a better blood safety record (Schreiber *et al.*, 2005; Cheraghali, 2012). As a result, understanding the deferral rate and describing the factors causing blood deferral among repeated donors is very important. This will help IBTO plan educational programmes for groups with higher deferral rates and with improving donor selection criteria. The aim of this study was to analyse the deferral status in a sample of repeat donors in a blood donation centre in a city located in south-western Iran.

The study was conducted in Shahrekord Blood Transfusion Center (one of the south-western transfusion centres in Iran) with the approval from the Research Center of IBTO. The IBTO has defined requirements for donation and deferral criteria, which all centres use through pre-evaluation and screening procedures. Each donor who presents for a donation is interviewed, physically examined by a trained physician and asked questions including risk factors and personal deferrable behaviours. During the examination, if a donor does not meet the national criteria of donor selection, he or she will be deferred. The deferral status of each donor is recorded as temporary or permanent, and no donation is allowed during the deferral period. At the end of the examination, the donor information, including acceptance or deferral status, category of deferral and reason for the deferral, are entered into the software (Cheraghali, 2012).

This study was designed as a cross-sectional follow-up study with a maximum of 5 years. First, a list was extracted of donors who had successfully donated blood for the first time from March 21, 2008 till March 20, 2009 and had been recorded in Negareh software system used by the Shahrekord Blood Transfusion Center. There were 5266 first-time records in the system, and 864 donors were selected based on systematic sampling with a sampling proportion of 16·4%. The selected donors were followed for a period of 4–5 years, until March 20, 2013. The sample size was calculated based on the percentage of donors who returned for the fifth donation or more (Kheiri & Alibeigi, 2015). In the 5-year attempts to donate, the reasons and rate of donor deferral were recorded and analysed according to age, gender, body weight, education level, occupation, stay and marital status.

The deferral codes were grouped into 11 categories for temporary deferrals, including drug consumption, low or high blood pressure/pulse, medical reasons, self-deferral, anaemia, polycythemia, cold, cupping, short interval duration and travel-related reasons, and five categories for permanent deferrals, including high-risk behaviours, hepatitis C virus (HCV), human immunodeficiency virus (HIV), repeated false positive virology results and some other medical reasons. After the interview, there was an option for the donor to confidentially announce that his or her blood should not be used by placing a note in a provided box. This type of deferral was categorised as self-deferral. All other reasons for deferral, or when there was lack of information about the deferral, were grouped as 'others'. Data analysis was carried out using χ^2, Fisher's exact and independent-t tests by SPSS software, and $P < 0{\cdot}05$ was considered statistically significant.

A complete illustration of the blood donors return behaviour, including frequency of return to donation and the time interval between the donations, were analysed and has been given in (Kheiri & Alibeigi, 2015). Of the 864 samples, 453 (52·4%) donors presented to donation during follow up, of whom, 428 (94·5%) were male. Their age at the first donation ranged from 21 to 69 years, with median of 34 years [interquartile range (IQR): 28–42] years. Their weight at the first donation ranged from 45 to 120 kg, with a median of 71(IQR: 80–87) kg. A total of 424 people (49·1%) had at least one other successful donation during follow up. The numbers of donors still donating at 1, 2, 3, 4 and 5 years after the study started were 178 (20·6%), 123 (14·2%), 121 (14%), 149 (17·2%) and 113 (13·1%), respectively. In total, 1405 donation attempts were made, of which 188 (13·38%) were rejected, comprising 20 (10·6%) female and 168 (89·4%) male deferrals. The number of deferrals during the follow up was between 0 and 6 times, with the mean of $0{\cdot}22 \pm 0{\cdot}59$ times. A total of 8 donors were deferred permanently, and 127 (14·7%) donors were deferred temporarily at least once (180 in total). This equates to 4·3% of deferrals being permanent (Fig. 1).

The deferral rate, as well as the number of samples and the number and the mean of those attempting to donate during follow up, are summarised in Table 1. The rate of blood deferral was significantly higher in females (33·9%) than males

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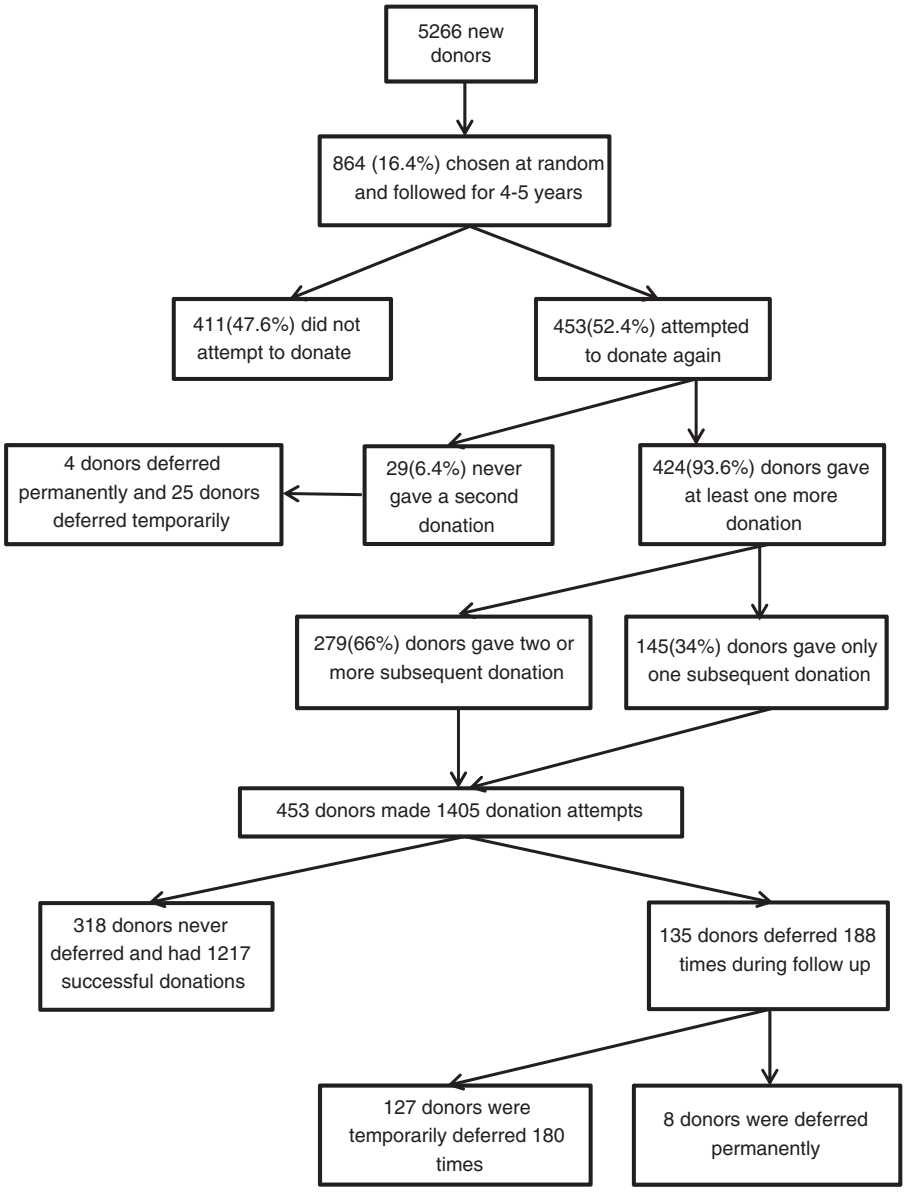

Fig. 1. A simple flow diagram of the number of donors attempting to donate and deferred.

(12·48%), ($P < 0·001$). Deferral was also significantly associated with occupation ($P < 0·001$). However, gender and occupation were found to be highly correlated (Fisher's exact test; $P < 0·001$), and therefore, occupation was analysed separately in males and females. No association between deferral and occupation was found in either males or females when analysed separately. Furthermore, deferral rate was not associated with marital status, age group, body weight group, place of living or education level (Table 1). There was no correlation between the number of deferrals and number of successful donations (Spearman; $r = -0·024$, $P = 0·617$). The mean number of returns to donation was $2·9 \pm 2·8$ times for donors who were deferred temporarily and $2·6 \pm 2·1$ times for donors who were not deferred ($P = 0·226$).

There were eight permanently deferred donors: all were male (age 28 – 49 years). The reasons for permanent deferral were false positive (two donors), HCV positive (two donors), HIV positive (one donor), high-risk behaviour (one donor) and medical reasons (2 donors).

There were 180 temporary deferrals, the most common reason being drug consumption (26·1%), low blood pressure (18·9%), medical reasons (10·6%), self-deferral (8·3%), high blood pressure (6·7%), anaemia (6·1%) and high-risk behaviour (5%), respectively. The seven most occurring temporary deferral reasons were significantly related to gender ($P < 0·001$) and age group ($P < 0·001$). As with other studies, the principle cause of deferral in women was anaemia (Smith *et al.*, 2013), whereas in men it was prescribed drug consumption. In male, other causes

Table 1. The number of samples, number of presenting to donation and deferral rate based on demographic characteristics

			Donors attempt to donation	Attempting		Deferral	
Variable	Level	Samples	*N* (%)	Number	Mean	*N* (%)	*P*
Gender	Male	801	428 (53·43)	1346	3·14	168 (12·48)	<0·001
	Female	63	25 (39·68)	59	2·36	20 (33·9)	
Age group (at first donation)	20 – 29	275	145 (52·73)	489	3·37	58 (11·86)	0·51
	30 – 39	278	153 (55·04)	449	2·93	67 (14·92)	
	40 – 49	192	106 (55·21)	310	2·92	44 (14·19)	
	≥50	119	49 (41·18)	157	3·2	19 (12·1)	
Weight group	≤65	144	50 (34·71)	109	2·18	19 (17·43)	0·42
	66 – 85	515	269 (52·23)	787	2·93	104 (13·21)	
	≥86	205	134 (65·37)	509	3·8	65 (12·77)	
Education	Elementary	158	75 (47·47)	227	3·03	32 (14·1)	0·54
	High school	207	108 (52·17)	355	3·29	44 (12·39)	
	Diploma	305	155 (50·82)	490	3·16	73 (14·90)	
	University	194	115 (59·28)	333	2·9	39 (11·71)	
Job (male)	Housekeeper	2	1 (50)	3	3	0	0·28
	Clerical	162	99 (61·1)	288	2·91	31 (10·8)	
	Worker	129	62 (48·1)	218	3·52	25 (11·5)	
	Free Job	385	206 (53·5)	605	2·94	90 (14·9)	
	Student	123	60 (48·8)	232	3·87	22 (9·5)	
Job (female)	Housekeeper	49	17 (34·7)	43	2·53	18 (41·9)	0·37
	Clerical	6	5 (83·3)	10	2	1 (10)	
	Worker	1	1 (100)	3	3	0	
	Free Job	1	0	0	0	0	
	Student	6	2 (33·3)	3	1·5	1(33·3)	
Total		864	453 (52·43)	1405	3·10	188 (13·38)	_

of deferral (low blood pressure, medical reasons, self-deferral) were dependent on age.

In this study, the blood deferral rate was estimated at 13·4%. As the repeated donors in this study were selected randomly from first-time successful donors based on systematic sampling, and because all centers in Iran use a uniform regulation and criterion for deferral (Abolghasemi *et al.*, 2009), the 13·4% should be a good estimate of deferral rate among repeated donors in this region of Iran. In the previous studies, which were conducted in Iran, the proportion of presenting donors who were deferred was between 13% and 30·9% (Mahmoodian-Shooshtari & Pourfathollah, 2006; Abolghasemi *et al.*, 2009; Cheraghali, 2012; Birjandi *et al.*, 2013; Kasraian & Negarestani, 2015). According to an article published in 2012 via statistical documents of IBTO (Cheraghali, 2012), the deferral rate in Iran increased from 14% in 2001 to 22% in 2011. A part of this increment was the very strict regulations for the deferral criterion in IBTO (Cheraghali, 2012). A study that was conducted in Isfahan showed that the deferral rate among lapsed donors was 9% and among first-time donors was 43% (Birjandi *et al.*, 2013). Another study that was conducted in Shiraz obtained a deferral rate of 13·1% for returning donors and 48·1% for the first-time donors (Kasraian & Negarestani, 2015). The findings of this study with regards to deferral rate of repeat donors are consistent with the abovementioned studies. One reason that the deferral rate in the repeat donors is much lower compared to first-time donors is that the repeat donor had at least one successful donation, and he or she is familiar with blood donation criteria. One of the main reasons also reported for deferral of potential donors at IBTO is low body weight. However, low body weight would usually only occur among prospective donors attempting to donate for the first time, and in this study, there were no cases of low body weight in returning donors. Therefore, it appears that the deferral rate in the national blood pool must be higher than the rate obtained in this study. These findings are good news for IBTO, which can trust repeat donors and invest resources to encourage them to donate.

The majority of deferrals in our study were temporary, with only 4·3% of deferrals being permanent, all of which were male. This finding is consistent with the other studies conducted in Iran which showed most deferrals were temporary (Birjandi *et al.*, 2013; Kasraian & Negarestani, 2015). Among occupation, housekeepers had the most and clerical and students had the least deferral rate. The lower deferral rate among students may be due to their higher knowledge about donation criteria.

If the data of occupations for men and women are merged, the occupation and deferral would be associated regardless of gender ($P < 0·001$). However, in our data, the gender and occupation are highly correlated (Fisher's exact test; $P < 0·001$), so association of occupation and deferral should be analysed separately in men

and women. As reported in the Table 1, the occupation was analysed separately. It is understood that no relationship was seen between occupation and deferral when we consider the effect of gender.

In this study, donation attempts among women equalled 39·7% compared to 53·4% for men, which shows a significant difference ($P = 0{\cdot}035$). However, women were more likely to be deferred than men. Also, fewer older people attempted to donate again (41% vs 53–55%), which approaches significance ($P = 0{\cdot}06$), and fewer people with lower body weight attempted to donate a second time (35% vs 52–65%), which is significant ($P < 0{\cdot}001$).

In our study, drug consumption was the most common cause for deferral. Analysing the deferral reasons in our study revealed that deferral reasons were related significantly to gender and age group. The results showed that drug consumption was the most common deferral reasons among men, and anaemia was the most common deferral reason among women. Based on national standard operating procedure (SOP) guidelines, the haemoglobin cut-off point for acceptance to donate is above 13 g/dL for male and 12 g/dL for female. The higher incidence of anaemia among females is expected due to increased iron deficiency as a result of menstruation, pregnancy and their previous success at donating (Javadzadeh Shahshahani *et al.*, 2005; Smith *et al.*, 2013; Kasraian & Negarestani, 2015). High-risk behaviour was only seen in males. Deferral also depended on age, with low blood pressure, self-deferral and high-risk behaviour being more frequent in younger donors but high blood pressure and medical exclusions more common among older donors.

Although in our study, the number returning to donation was not significantly different between donors who were deferred temporarily and those had not deferred ($P > 0{\cdot}05$), other studies have showed deferral to have a negative effect on motivation. A large number of blood donors who were deferred temporarily had not returned for subsequent donations (Custer *et al.*, 2007; Smith *et al.*, 2013). It is very helpful to explain to temporary deferred donors the importance of blood donation and the assurance about the health of donors and recipients to maintain their motivation to return again. Deferral procedures should be managed properly to avoid unnecessary deferrals and to maintain blood donor pool.

The number of individuals in this study is lower than other studies. This is because we extracted a random sample of returning donors, but in other investigations, all donors in a specific period were studied. Based on the rate estimated in this study, with a high precision the sample size is adequate, so the overall rate is a good estimation and can be generalized to all repeated donors in the centre. It appears that the deferral rate in this study could be a good estimate of deferral rate among returning donor population of Iran due to homogeneity of deferral procedure among all centres in Iran; however, other studies should be conducted in other centres of the country in order to ascertain this claim.

The majority of deferrals among repeat donors were temporary and could be easily controlled; therefore, interventional or educational programmes about donation criteria for deferred donors are suggested in order to maintain and even increase them in the national blood pool.

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CONFLICT OF INTEREST

The authors have no competing interests.

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